

New Jersey

Department of Transportation

Bureau of Research

Research Process

2003



Annual Research Schedule

| | |
|--|-------------------------|
| | <u>Current</u> |
| Solicitation of Problem Statements | Nov 15 – Jan 1 |
| Review, Clarify, & Prioritize Problem Statements | Jan 1-Jan 31 |
| RUC Review | Feb 1-Feb 15 |
| Develop Scope of Work/RFP and Literature Review | Feb 15 – Mar 31 |
| Distribute Scope of Work and RFP | April 1 |
| Receive Initial Proposals | July 1 |
| Review & Select Proposal | July 1-Aug 15 |
| Receive Final Proposal | Aug 15 – Sept 15 |
| Research Activity Sheet for FHWA | Sept 1 |
| Research Project Manager and PI Develop Project Work Plans and Implementation Plan | Sept 15 – Jan 1 |
| Develop Annual Work Program Initial draft to FHWA | Sept 15-Sept 30 |
| Approve Annual Work Program RUC & FHWA Review | Oct 1-Oct 15 |
| Prepare & Issue Task Orders Issue letter of intent ASAP | Oct 15-Dec 31 |
| Effective Start Date | January 1 |

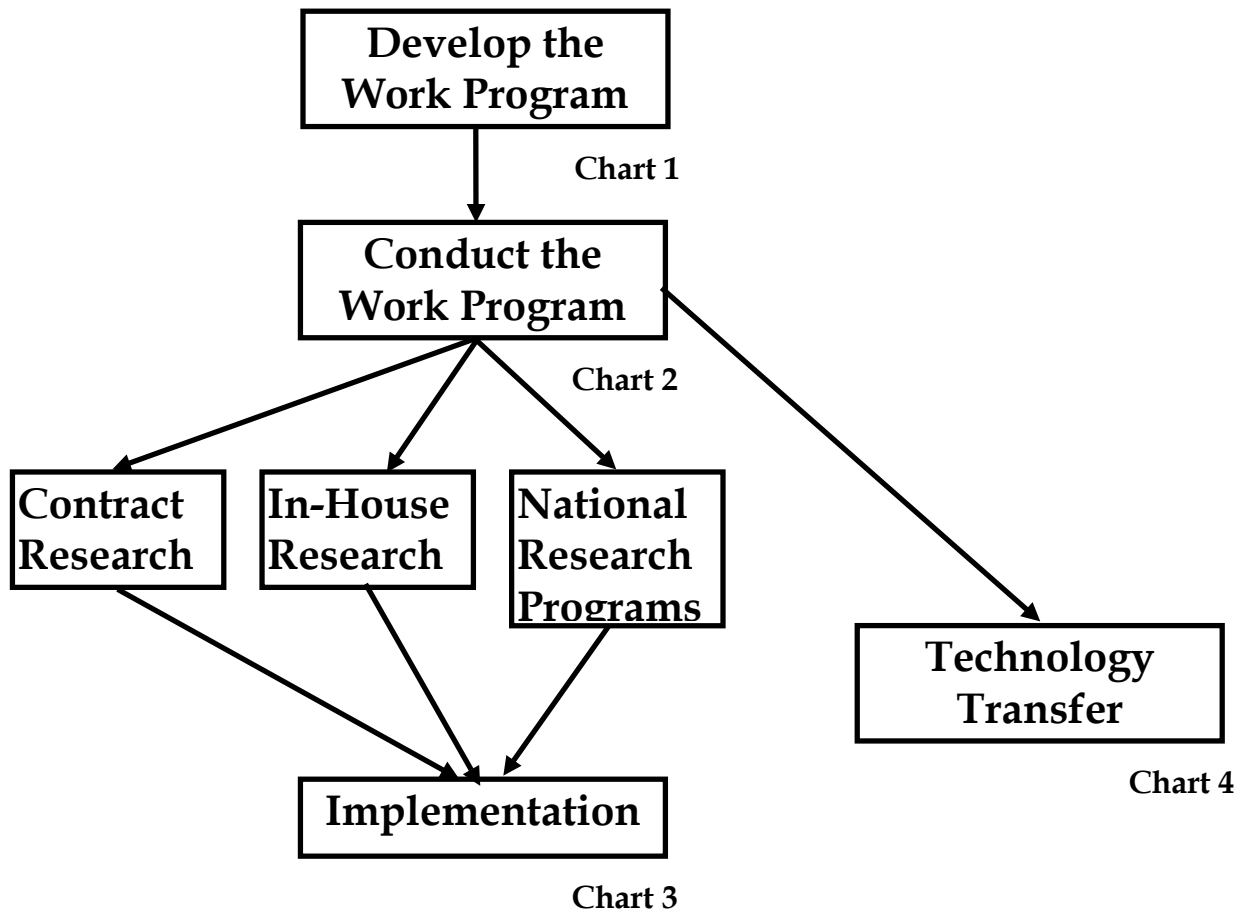
Revised as of 3/15/2001

Annual Research Schedule tie into the Mutual Service Standards

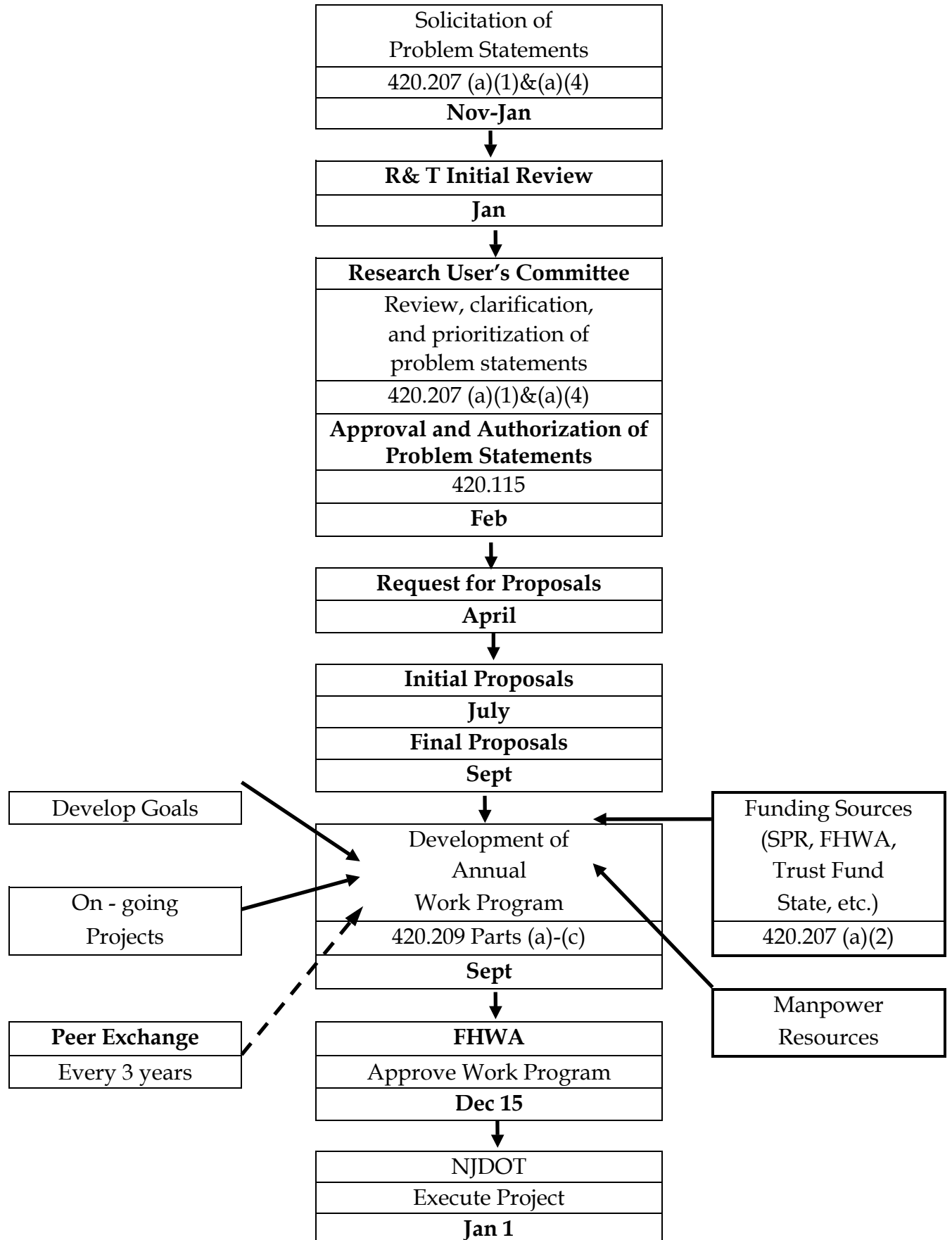
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| Research Activity Sheet for FHWA | Sept 1 |
| Receive Final Proposal | Sept 15 |
| Develop Annual Work Program | Oct 1* |
| Approve Annual Work Program RUC & FHWA Review | Oct 15 |

* The Manager, Bureau of Research will provide FHWA a list of any research projects that need to be moved from the current two-year agreement to the new agreement by Oct 1 of the second year of the agreement.

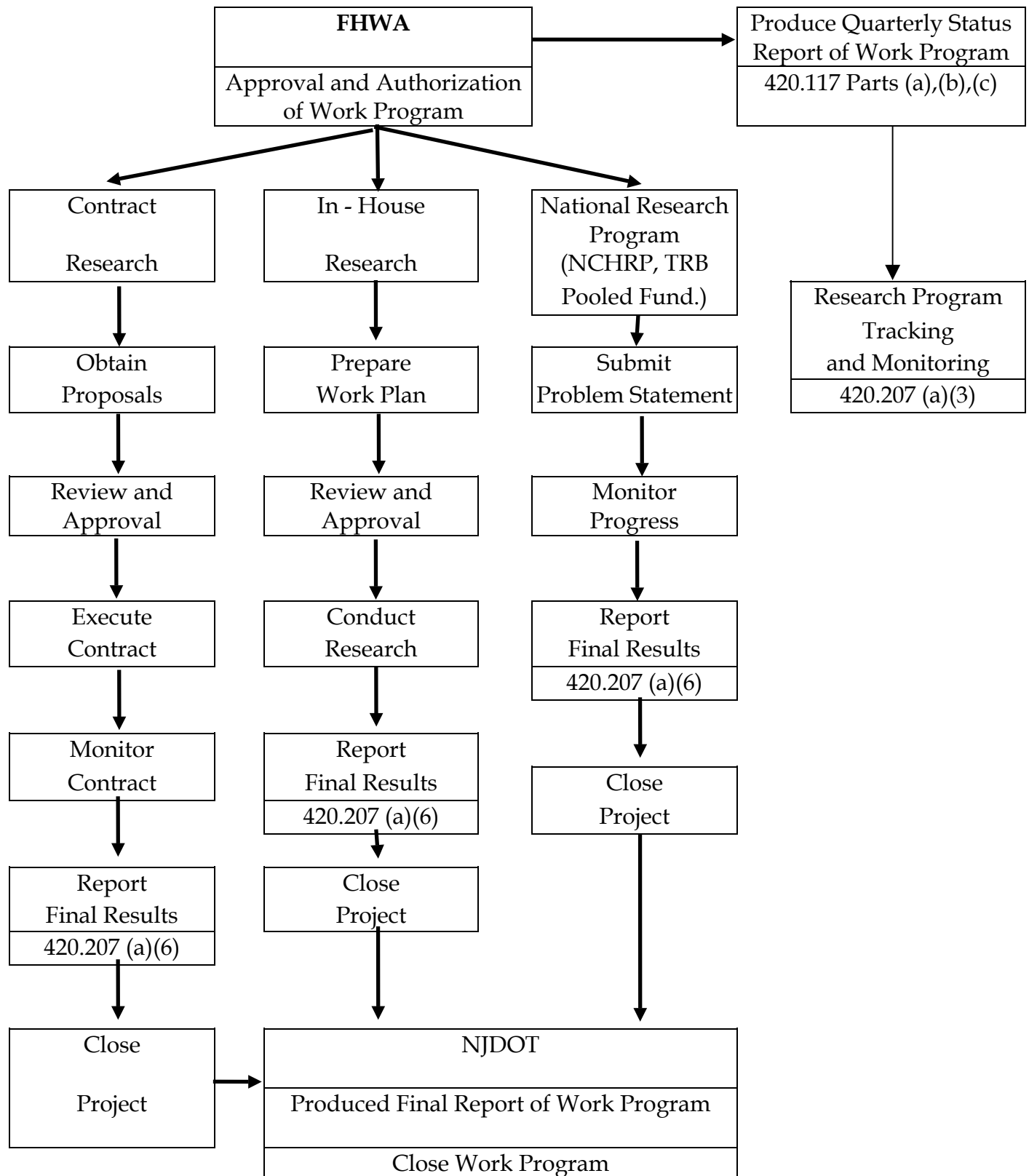
NJDOT RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER PROGRAM MANAGEMENT PROCESS



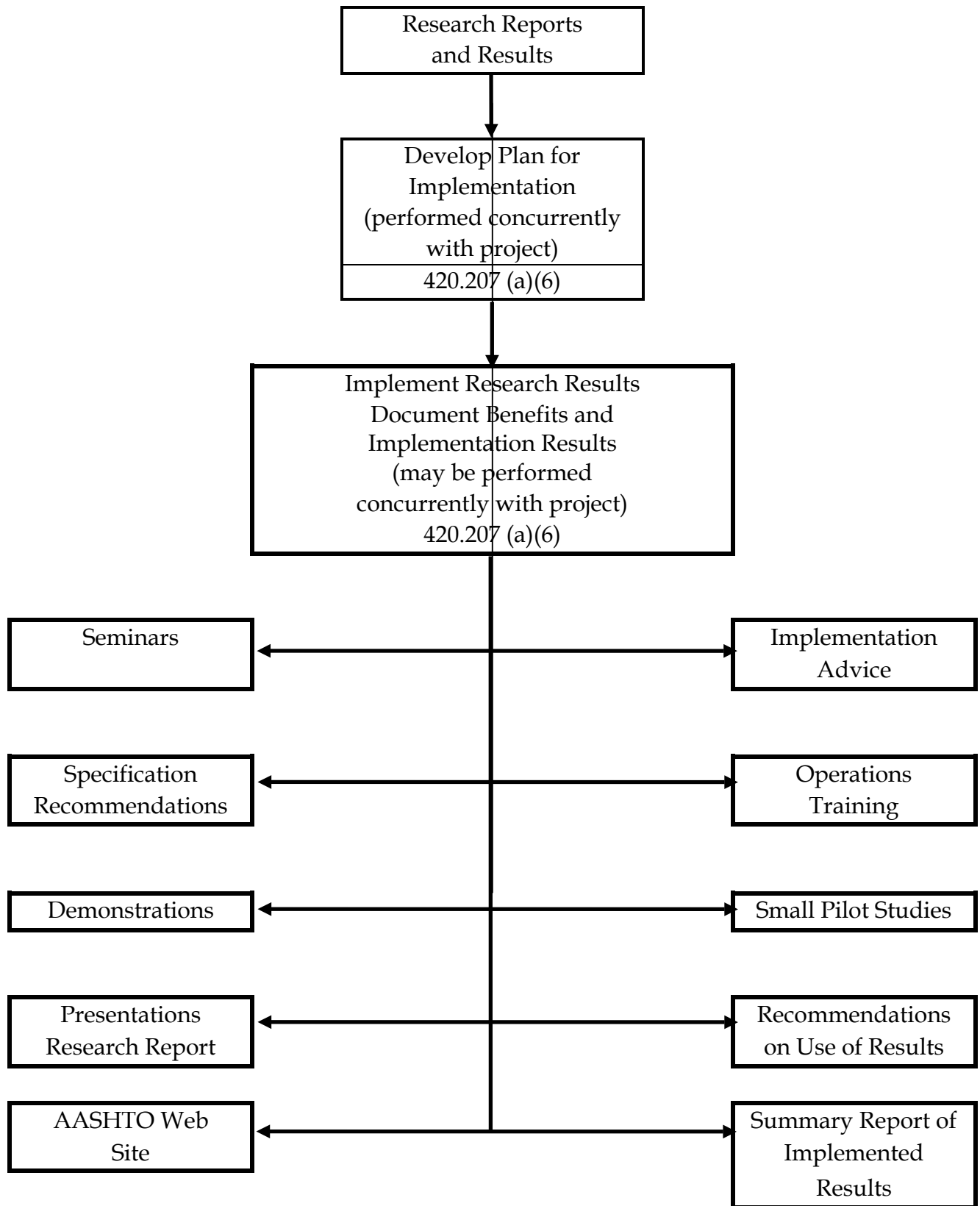
1. DEVELOP THE WORK PROGRAM



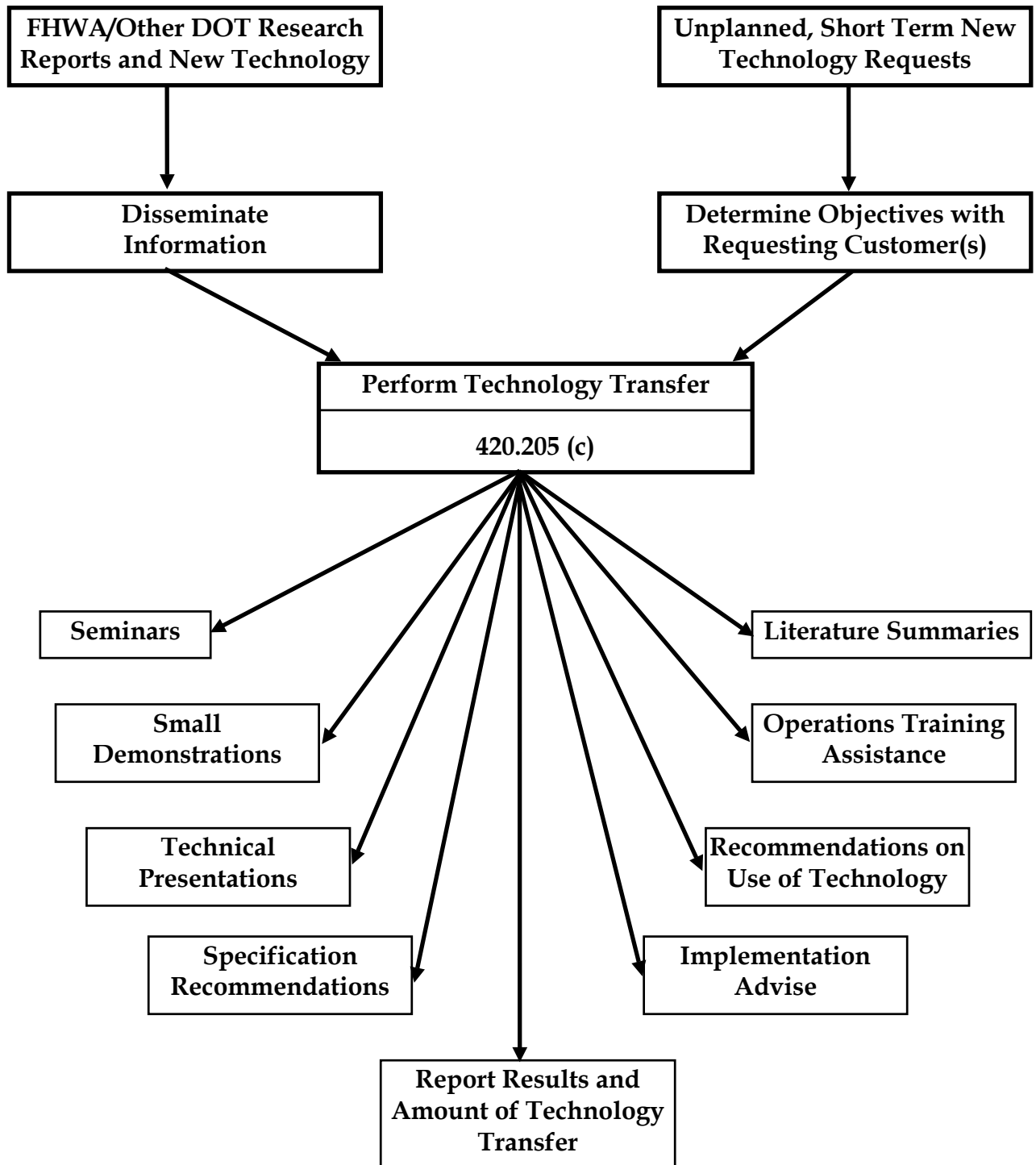
2. CONDUCT THE WORK PROGRAM



3. IMPLEMENTATION



4. Technology Transfer



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Introduction

The research process that follows is based on the requirements of 23 CFR 420, specifically sections 420.213 that covers the certification requirements. It conforms to the annual research schedule, which are activities and dates that were mutually agreed upon by the NJDOT, the University research partners, and the NJ Division of FHWA. This document cites current guidelines of the NJDOT Bureau of Research for proposal preparation, budget and invoice preparation and evaluation, and final report preparation. In addition, the appendix contains examples of cited reports and contract tools.

Section 1. Development of the Annual Research Work Program

PROBLEM STATEMENT SOLICITATION, REVIEW AND PRIORITIZATION

Solicitation of Problem Statements

In an effort to assure that all problems and other new scientific and technical needs are adequately addressed, the Bureau of Research will annually solicit written problems statements (See Appendix – Research Problem Statement) from the staff of NJDOT and other appropriate organizations through their middle level managers. The problem statements can cover any area, which the submitter feels might benefit transportation in the State. Although this is a formal solicitation, research requests are accepted at any time. Problems received after the end of the solicitation period will be considered in the next annual program.

Research staff and manager will meet with their ongoing customers to discuss both short and long-term research needs. The Manager of the Bureau of Research will meet with the secretary of the policy and priorities board to discuss their research needs.

Review of Problem Statements

The Manager of the Bureau of Research will assign the submitted problem statements to the research staff for review, and evaluation. Assigned research staff will contact the submitter for additional information or clarification. The results of this initial evaluation and discussion with the submitter will determine if the problem is of sufficient value to continue the review. If the submitted problem is being or has been resolved by research known to the research staff reviewer, or does not require work relevant to the directives of the Department, an appropriate response will be sent to the submitter and the submitter's middle level manager. The problem statements, which require further evaluation, will undergo the following steps:

1. Persons known to the reviewer and/or found in research literature who are knowledgeable in the state of the art of the research and technical aspects of the subject area will be

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contacted, if necessary, for discussions of the research problem or to further clarify the state of the art of knowledge or practice. The reviewer will clarify the possible benefit to transportation with the submitter and determine the primary user or customer of the end product.

2. If the reviewer determines that the problem warrants a formal scientific experiment or evaluation, a brief literature search will be conducted directly covering that aspect of the problem. The search will utilize all available resources, such as the Research-In-Progress (RIP), Transportation Research Information Service (TRIS), National Resource Center (NRC), and the NJDOT Research Library; to determine if sufficient previous or ongoing research already exists. If the search results support the need for further research, they will be summarized to provide additional information for more accurate scoping of the problem.
3. For each problem statement, the reviewer will recommend a disposition (i.e., no action with explanation, memo of referral or technical advice, research literature synthesis, survey of the current practice, research, or technology), and a resource category (i.e., in-house, consultant, research center, other university, NCHRP, FHWA Pooled Fund, etc.).
4. For action recommendations, the reviewer will prepare a Final Disposition Report (FDR) summarizing the problem to be addressed, the suggested approach, the recommended disposition, the resource category, an estimate of the person-months, time line, and budget. This document will include the name, unit, and phone number of the submitter and the potential customer. This information is contained on the Final Disposition Report (FDR) (See Appendix – Final Disposition Report)
5. When all the problem statements have been reviewed and recommendations determined, a summary table, which includes the problem number and description, reviewer's name, submitter's name, potential customer's name, type of work needed, and recommended disposition and resource, will be prepared for the Manager, Bureau of Research. The summary table and the FDR will be used to present candidate projects to the Research Users Committee (RUC) (See Appendix – Description of the Research User's Committee) for prioritization and approval for programming.

The reviewer will notify the submitter of the recommended disposition of each problem assigned for review, whether or not the idea has been recommended for programming. The Manager, Bureau of Research will notify the submitter's middle manager whether or not the idea has been recommended for programming.

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Prioritization of Problem Statements

To optimize the use of resources of the Bureau of Research (See Appendix -Resources Available for Research), all candidate projects and ongoing projects will be categorized and presented to the RUC. The research customer presents all new candidate projects to the RUC. The RUC will prioritize the research project in the work program.

REQUEST FOR RESEARCH PROPOSALS AND EVALUATION OF PROPOSALS

Request for Proposals

The Research project selection and implementation panel will prepare a Request For Proposal (RFP) for candidate projects considered a high priority by the RUC. (See Appendix – Request for Proposals). The RFPs will be sent to all University Research Partners to solicit proposals. Proposals will be prepared in accordance with the current **INFORMATION AND INSTRUCTIONS FOR PREPARING PROPOSALS** and the **GUIDELINES FOR PREPARING AND REVIEWING BUDGETS AND INVOICES** and posted on the NJDOT Bureau of Research web site.

Review and Evaluation of Initial Proposals

Upon receipt of the initial proposals, the research project manager meets with the research project selection and implementation panel for the given project to provide them with instructions on reviewing and evaluating the proposals. (See Appendix – Responsibilities of the Research Project Selection and Implementation Panel and the Proposal Evaluation). The Research Project Selection and Implementation Panel consists of the research project manager, the research customer, and other stakeholder that have technical knowledge of the research subject. Research project managers are encouraged to reach out to the NJ Division office of FHWA for panel members. The Research Bureau manager will provide a list of the new and continuation projects to NJ Division office of FHWA for panel members. At this stage, the proposals are reviewed strictly for technical merit. Budgets are sealed in separate envelopes to be reviewed after the proposals are evaluated.

After the proposals are reviewed, the panel meets to discuss the evaluations and select the proposal that best meet the research needs as stated in the RFP. If no proposal is acceptable, the research project manager may request that the problem be re-submitted in the next annual research program after discussion with the Research Project Selection and Implementation Panel.

The research project manager will arrange for a meeting with the Research Project Selection and Implementation Panel and the Principal Investigator (PI) of the successful proposal to discuss refinements to the scope of the work, tasks outlined in the proposal, the schedule, and the budget. The research project manager works with the PI to develop the final proposal and budget.

DEVELOPMENT, APPROVAL AND REVISION OF WORK PLANS/PROPOSALS

There are two types of Work Plan/Proposals – In-house (using NJDOT research staff) and external (using university research partners or consultants).

In-house Research Work Plan/Proposal

A Research Work Plan/Proposal will be prepared for each In-house research project. The work plan is a written project proposal to perform research that obligates the New Jersey Department of Transportation, Bureau of Research to accomplish the objectives, and conduct the activities for the estimated costs.

The work plan/proposal will describe the steps needed, as guided by the scientific method, to justify the estimated costs and resources and satisfy the research request in a way that will lead to a usable or deployable result, including both positive and negative recommendations, where appropriate. Project results may be in the form of a resolution of, answer to, or solution to a technical issue, problem, or question; an evaluation of a new technology; development of a new device, system, or technique; or the testing of a hypothesis or theory. Of necessity, the work plan/proposal is devised long before the work is undertaken, so it may require revision once the project has started, especially where specialized state-of-the-art equipment is needed for data collection, where data collection is weather dependent, or where more is learned about the detailed effort needed to enhance the chances of a useful result.

Work Plan/Proposal Process

The Research Project Selection and Implementation Panel, organized by the Project Manager, will develop and review the Work Plan/Proposal.

Work Plan/Proposal Content

The Work Plan/Proposal contains a description, a breakdown of general activities, a few key completion milestones and a breakdown of expected staff time by fiscal year, the estimated expenditures under major categories by fiscal year. The Work Plan/Proposal will consist of the following:

1. Title Page which will contain the:

Title of the proposed work

Name, title and mailing address of the Principal Investigator who is to bear scientific responsibility

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Name and unit of the Project Manager accountable to provide project results and products.

Name and unit of the primary customer(s)

Date submitted

2. Main body which will contain the:

Background: The need for the research, technology transfer, and/or implementation in which the operational units of the Department have expressed interest. A summary of the current research, technology, and/or practice and the remaining research or technology transfer needs. A brief synthesis of the state of the art of research as suggested from a TRIS review of the national research literature, if a formal scientific experiment or evaluation is proposed.

Objective(s): One or more major objectives to be accomplished by the research, technology transfer, and/or implementation.

Methodology: The proposed scientific or technology transfer methodology plan, such as the methods planned for the literature review, survey of the state of the art, case study, development, demonstration, evaluation, experimental, data collection, site selection, data analysis, statistical analysis, and/or subcontract plan as appropriate.

Benefits: Brief statements of how the results are projected, directly or indirectly, to benefit the Department's operations, facilities, transportation in general, transportation environment, or transportation users, through such improvements as efficiency, safety, life cycle, durability, cost reduction, effectiveness, health and capacity.

Activities: A list of four or five major milestone activities, including the completion of the Final Report, to be progressively carried out. Brief, detailed tasks necessary to complete each larger milestone activity will be included.

Implementation: A list of suggested units and agencies to be represented in the Technical Panel, if appropriate. An explanation of how the project plan provides opportunities for earliest use of the results, as they are determined and how the research results or technology transfer will be used, deployed, or institutionalized by NJDOT.

3. Resources planned will include the:

Staffing: Estimated man-months for each position by fiscal year.

Cost Summary: Total federal and state fund reimbursable costs for each position and major category, including staff total, fringe benefits, indirect cost, non-salary direct costs, subcontractor cost noting the first fiscal year of obligation, other reimbursable categories under the SPR Program, and a project total.

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Work Schedule: A bar chart showing milestone activities by month and fiscal year from expected beginning to expected end.

Approval of Work Plans/Proposals

Work plan/proposal approval shall include the following steps:

1. The Research Project Selection and Implementation Panel will review and sign off on the work plan. The work plan will be revised, if appropriate, based on comments from the panel.
2. A review and sign off by the Manager, Bureau of Research.

The Manager, Bureau of Research will provide a copy of the approved SPR-funded Work Plan to the program-funding agency for their records through the NJDOT SPR fund supervisor.

Revising Work Plans

Assuming that adequate funds and personnel are foreseen as being available at the time the work plan is approved, and that adequate time has been scheduled minimize deviations therefrom, the following reasons may be cited for revising the work plan:

1. Project cost need to be changed when the federal share of the project exceeds \$100,000 and the cumulative amount of such transfers exceeds 10% of the total project budget. This could be due to unexpected personnel salary changes, equipment costs, or unforeseen problems in completing work plan tasks. In accordance with 49CFR, part 18.30 or 49 CFR part 19.25 (f).
2. A change of scope is required. This could be at the request of the sponsor, the result of information obtained during the course of the project, an increase or decrease in available funding or personnel, or other pertinent and pressing reasons.

A justification for budget and/or scheduling changes shall include the following information where applicable. For contract research, the primary contractor shall provide the justification.

1. Reasons for project exceeding original cost estimate. This could be due to unexpected personnel salary changes, equipment costs, or unforeseen costs associated with completing work plan tasks.
2. Reasons for not maintaining project schedule. Examples include:

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- a. Equipment failure or malfunction. Time lost shall be cited in weeks.
 - b. Unsuitable weather conditions at data collection site(s). Because of the considerable distance to some sites, this implies that some trips will result in no data being collected. Time lost shall be cited in weeks
 - c. Unforeseen difficulties in data reduction and/or data analysis. The time needed beyond that, which was scheduled, shall be cited in weeks
 - d. Unforeseen difficulties in implementation. The time needed beyond that, which was scheduled, shall be cited in weeks.
- 3. A statement of project accomplishments to date, vis-à-vis the original schedule.
 - 4. Reasons for a change of scope. These shall be detailed enough to justify the change and shall include citing any additional benefits or results that may be expected to accrue from the change. If the project is to be condensed, loss of benefits or results shall be cited.
 - 5. A revised work plan, including a revised budget and schedule.

Requests for zero-dollar budget modifications and extensions of time are requested by letter and reviewed by the research project manager and approved by the Manager, Bureau of Research and Director, Division of System Planning and Research, if the time extension does not extend the federal agreement. If the time extension modifies the end date of the federal agreement, the FHWA Division Office must approve the extension.

Modifications that change the project budget (add or reduce funds) require contract modification. These are reviewed by the research project manager, the Manager, Bureau of Research and Director, Division of System Planning and Research, and approved by the FHWA Division Office.

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Approval Authority Schedule

The following Approval Authority Schedule will be adhered to during the conduct of the Research Work Program and the individual projects contained in that document.

| ITEM | ACTION |
|--|---|
| Additional Federal Funds | Review of NJDOT SPR Manger and FHWA Division Office Approval Required |
| Scope changes, | FHWA Division Office Approval Required |
| Extension of time (beyond the SPR agreement) | FHWA Division Office Approval Required |
| Purchase of Equipment – in excess of \$5000 | FHWA Division Office Approval Required if not included in work plan |
| Review of draft Final Report | FHWA Division Office Review Required |
| Contracting Out, Subgranting, or Otherwise Obtaining the Services of a Third Party | FHWA Division Office Approval Required if not included in work plan |

Requests for changes cited above will be made (in letter format) from the Manager of Research through the SPR Financial Manager to Federal Highway NJ Division Office attn: Manager of Policy and Research. Informal “concept” approval requests may be e-mailed from the Division to FHWA for review.

University Research Proposal

The University Proposal/Work plan is similar to the In-house Research Work Plan/Proposal described above.

Proposal Content

The proposal content is described in the current **INFORMATION AND INSTRUCTIONS FOR PREPARING PROPOSALS** and the **GUIDELINES FOR PREPARING AND REVIEWING BUDGETS AND INVOICES**.

Approval of Proposals

The research selection and implementation panel recommends approval of the university proposal to the Manager, Bureau of Research. The Manager and Director, Division of System Planning and Research approves the proposal and provides a copy to the NJ Division of FHWA for their records. The proposal becomes part of the task order issued to the university to contract the work effort.

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Revising Task Order

Requests for zero-dollar budget modifications and extensions of time are requested by letter and reviewed by the research project manager and approved by the Manager, Bureau of Research and the Director, Division of System Planning and Research, if the time extension does not extend the federal agreement end date. If the time extension modifies the end date of the federal agreement, the FHWA Division Office must approve the extension.

Modifications that change the project budget require contract modification. These are reviewed by the research project manager and approved by the FHWA Division Office.

Approval Authority Schedule

The following Approval Authority Schedule will be adhered to during the conduct of the Research Work Program and the individual projects contained in that document.

| ITEM | ACTION |
|---|---|
| Additional Federal Funds | FHWA Division Office Approval Required |
| Purchase of Equipment – in excess of \$5000 | FHWA Division Office Approval Required if not previously approved in work program |
| Contracting Out, Subgranting, or Otherwise Obtaining the Services of a Third Party | FHWA Division Office Approval Required if not previously approved in work program |
| Changes in scope or objectives of the project, even if no budget change is required | FHWA Division Office Approval Required |
| Change in key person (Project Manager) | FHWA Division Office Approval Required |
| Absence of PI for 25% of time | FHWA Division Office Approval Required |
| Transfer of Training Dollars to other areas | FHWA Division Office Approval Required |
| Review of draft Final Report | FHWA Division Office Review Required |

Requests for changes cited above will be made (in letter format) from the Manager of Research through the SPR Financial Manager to Federal Highway NJ Division Office attn: Manager of Policy and Research. Informal “concept” approval requests may be e-mailed from the Bureau to FHWA for review.

DEVELOPMENT OF THE WORK PROGRAM DOCUMENTS

Development of the Work Program Budget

The development of the biennial SPR research work program will be coordinated through the SPR program coordinator and it will be administered under the approval of NJDOT/FHWA joint service standards. The research bureau manager, the project managers, and financial staff work together to develop an annual research and technology budget that incorporates the costs of new project, continuation project, and other expenditures such as Commissioner's Challenge Grant, Pooled Fund studies, and TRB and NCHRP dues. The team will try to leverage as much match money from the University programs as possible. The work program budget will provide details of the sources of funding from SPR, Transportation Trust Fund, and other sources. When a draft work program budget is complete, the Manager, Bureau of Research will meet with the NJ Division of FHWA to review the draft program. After approval of the draft work program, the Manager, Bureau of Research will meet with the RUC to discuss the details of the upcoming annual program.

Following the Research User's Committee (RUC) approval of projects, the Bureau of Research will notify the universities and prepare task orders and contract modifications to begin work on the program starting January 1 of each year.

Work Program Document Description

The Research work program document will describe the research activities and funding levels proposed for the upcoming program year. The work program will describe the research activities or projects that are approved by the RUC for expenditure of funds. The work program will include projects that will be conducted by in-house research staff, by consultants and by universities and technology transfer efforts including Department-wide task forces, and pooled fund projects. The program will contain a financial summary of the FHWA and State funding effort.

Work Program Components

The summary of new and continuing research and technology transfer activities will be documented in a work program book that describes each project and provides details of the estimated funding requirements.

1. Work Program Documentation

The major research activities and projects will be organized into relevant categories.

2. Project Description

The project description will include a project title, project number, a Research Project Manager

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and a purpose, objectives, tasks, and the proposed activities for the program year or period required.

3. Research Staff Commitment

Projects will contain summaries of in-house research staff efforts including the estimated man-month commitment. The estimates will include the research staff effort needed to conduct administration, in-house research projects, technology transfer activities, and management of consultant or university research contracts.

4. Consultant or University Commitments

Each project that includes a consultant or university effort will describe the work effort and note the estimated cost of the effort to be accomplished in-house and outside the Department.

5. Project Costs

Each project will show cost account estimates for contractual cost and in-house salary, fringe, and extraordinary costs such as material/supplies, travel, services, data processing services, printing, data processing, and equipment and costs.

6. Summary breakdown of estimated funding levels and share (Federal, State, and other sources).

7. An overall summary of the project costs will be prepared that will contain the salary, fringe, non-salary, contractual, and extraordinary costs and will be divided into federal and state funding sources.

The Bureau of Research will meet with the FHWA to discuss the draft annual program and provide copies of the activity summary sheets for review. Once all issues are addressed, the final annual work program will be compiled and sent to the NJ Division of FHWA for their approval through the SPR Financial Manager.

Revisions to the Annual Work Program

Assuming that adequate funds and personnel are foreseen as being available at the time the work plan is approved, and that adequate time has been scheduled minimize deviations therefrom, the following reasons may be cited for revising the work plan.

1. Project cost need to be changed when the federal share of the project exceeds \$100,000 and the cumulative amount of such transfers exceeds 10% of the total project budget. This could be due to unexpected personnel salary changes, equipment costs, or unforeseen problems in completing work plan tasks.

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2. Addition of Program activities after the program is approved. This could be at the request of the sponsor, the result of information obtained during the course of the program, an increase or decrease in available funding or personnel, or other pertinent and pressing reasons.

A justification for budget and/or scheduling changes shall include the following information where applicable. For contract research, the primary contractor shall provide the justification.

1. Reasons for project exceeding original cost estimate. This could be due to unexpected personnel salary changes, equipment costs, or unforeseen costs associated with completing work plan tasks.

2. Reasons for not maintaining project schedule. Examples include:

a. Equipment failure or malfunction. Time lost shall be cited in weeks.

b. Unsuitable weather conditions at data collection site(s). Because of the considerable distance to some sites, this implies that some trips will result in no data being collected. Time lost shall be cited in weeks

c. Unforeseen difficulties in data reduction and/or data analysis. The time needed beyond that, which was scheduled, shall be cited in weeks

d. Unforeseen difficulties in implementation. The time needed beyond that, which was scheduled, shall be cited in weeks.

Requests for zero-dollar budget modification and extensions of time (that do not affect the federal agreement end date) will be discussed with the members of the research selection and implementation panel at the quarterly meetings and approved by the Manager, Bureau of Research and the Director, Division of System Planning and Research. In addition, a copy of the approval will be sent to the Division Office of the FHWA for their records. Modifications that add Federal dollars or have the effect of extending the federal agreement will be sent to FHWA for their approval.

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Approval Authority Schedule

The following Approval Authority Schedule will be adhered to during the conduct of the Research Work Program and the individual projects contained in that document.

| ITEM | ACTION |
|---|---|
| Additional Federal Funds | FHWA Division Office Approval Required |
| Changes in scope or objectives of the project, even if no budget change is required | FHWA Division Office Approval Required |
| Purchase of Equipment – > \$5000 | FHWA Division Office Approval Required if not included in work plan |
| Review of draft Final Report | FHWA Division Office Review Required |
| Addition or deleting of program activities | RUC Approval and FHWA Division Office Approval Required |
| Transfer of funding allotted for training activities | FHWA Division Office Approval Required |
| Change in key personnel (Project Manager) | FHWA Division Office Approval Required |

Requests for changes cited above will be made (in letter format) from the Manager of Research through the SPR Financial Manager to Federal Highway NJ Division Office attn: Manager of Policy and Research. Informal “concept” approval requests may be e-mailed from the Bureau to FHWA for review.

Section 2. Conducting the Research Work Program

RESEARCH CONTRACTING PROCESS

The Bureau of Research develops and executes contractual agreements for research projects performed by institutions of higher education, consultants, and other outside agencies. The processes used ensure that all applicable NJDOT, State of New Jersey, and federal laws, rules, and regulations are followed, adequate monitoring of contractor progress and invoicing are performed, and reports are appropriately documented, reviewed and distributed.

Research Contracts Using Basic Agreements With Universities

Basic Agreements are pre-executed instruments between NJDOT and the institutions of higher education to perform future research and planning projects compatible with capabilities within those institutions and state and federal rules for contracting with Institutions of Higher Education. For research projects with these institutions, research proposals are requested, drafted and received based on the detailed RFP developed by the Research Project Selection and Implementation Panel. Multiple proposals received in response to a request for proposal will be reviewed with a set of established criteria. (See Appendix – Proposal Evaluation)

Selected proposals are negotiated by assigned NJDOT Research Project Managers and the Research Project Selection and Implementation Panel with the Principal Investigators until they are satisfactory.

Task Orders are executed by the Manager, Bureau of Research, who authorizes the institutions to proceed with specific projects. The Task Order, the negotiated proposal, and the Basic Agreement work together, as a contract to define the task and contract activities required. The pre-executed Basic Agreement defines the negotiated administrative laws, rules, procedure and process. This allows the Task Order for a research project to be executed in a short time. Task orders under the Basic Agreement are intended to be low cost, short term in nature, and originated by NJDOT. The Basic Agreement and appropriate administrative guidelines defines the Task Order, Invoices, Final Invoice, Progress Reports, and Final Report requirements and process.

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Monitoring of the Research Work Program

NJDOT Research Quarterly Progress Meetings

Quarterly project progress meetings are conducted to provide a forum for the Principal Investigator to discuss the project progress with the Research Project Selection and Implementation Panel and other interested parties. The discussion focuses on the activities of the last quarter, the planned activities of the next quarter, highlights success and failures, and any changes in scope, time, or schedule. These are documented on the NJDOT Research Quarterly Progress Report.

NJDOT Research Quarterly Progress Reports

Quarterly project progress reports shall be provided by the Principal Investigator at the school to the Project Manager and Research Project Selection and Implementation Panel at NJDOT. (See Appendix – Quarterly Report)

The research quarterly meetings and reports are scheduled to provide information for the quarterly SPR work program report required by FHWA. A report listing the accomplishments of each project will be sent to the FHWA Division Offices for their information. (See Appendix – FHWA Quarterly Report)

Contract Invoices

The NJDOT and the contracting institution will agree to an adequate process and period for submission and acceptance of invoices for payment by the NJDOT according to the contract and for reported work done. (See Appendix – Invoice) Appropriate summary documentation as per contract will be attached

Section 3 – Completing the Annual Work Program

Preparation and Distribution of Final Reports

Final Reports are required for all research projects. A Final Report draft will be prepared by the Principal Investigator three months before the mutually agreed completion date of the project and submitted to the Research Project Selection and Implementation Panel for their review and comment. The draft final report will also be sent to the NJ Division of FHWA for their review and comments. The draft will be reviewed regarding the accomplishment of the agreed work. The comments of the Research Project Selection and Implementation Panel and FHWA will be given to the Principal Investigator. The Principal Investigator will revise the Final Report giving appropriate consideration to comments received and deliver the final report to the Bureau of Research.

Copies of the Final Report will be distributed by the Bureau of Research to the customer, other relevant NJDOT employees, the NJDOT Research Library, the State DOTs, the FHWA, the State Library, and the National Technical Information Service (NTIS) in accordance with the current distribution plan.

Once the final report is accepted, the Principal Investigator will be notified to submit a Final Invoice according to the contract terms.

Upon distribution of the Contract Final Report and payment of final invoice, the Manager, Bureau of Research will authorize the project to be closed out, unless the contract is only part of a larger encompassing project, which is incomplete.

Project and Program CLOSE OUT PROCESS

The contract vendor is required to submit a final report and invoice within 60 days of the approved project completion date.

Project Close Out Process

Project Managers will prepare a letter to FHWA for the Manager, Bureau of Research. The letter will include:

Federal Project Number and Title of the project;

Reference to the title of the Final Report and that it is attached.

Cost Summary including Authorized Amount with modifications, Total expended, % Expended, and Project Authorization date; and Original Completion date.

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Years during which the project was active and the funding agreements that were involved.

An explanation of and justification for significant differences between the approved and actual scope, completion time or cost. The letter will include steps taken to keep the project on schedule and within budget.

The letter and final report will be sent to the FHWA through the NJDOT SPR financial manager. After approval, the project final report will be added to the NJDOT Bureau of Research web site and the project manuscript file.

Work Program Closeout

The SPR coordinator will initiate a request for final acceptance of the Annual Work Program within ninety days after the federal agreement completion date. The Manager, Bureau of Research will submit a Final Report for the biennial SPR research program within 60 days of the Federal-aid agreement completion date to the SPR program coordinator.

PEER EXCHANGE

Purpose

The objectives of a peer exchange program is to give state highway agencies a means to improve the quality and effectiveness of their research program. Peer Exchange is designed to invite outside team of top level managers to meet with the host agency to discuss and exchange practices that may improve its RD&T program. The host agency outlines several objectives relating to research management issues that may benefit from an exchange of ideas with other research professionals, other DOT staff, and other stakeholders.

Frequency

The peer exchange process will be conducted at least once every three years or as prescribed by the FHWA guidelines.

Selection of Team Members

The NJDOT Manager of Research is responsible for selecting and organizing the peer exchange team. The peer exchange team may consist of research personnel from the other state highway agencies, universities, FHWA Division, Washington Headquarters, TRB and other research organizations.

Activities

Documentation outlining the NJDOT procedures for conducting its research program will be made available to the peer review team along with other information deemed to helpful in accomplishing the selected objectives. These may include description of the research organization, description of the research process, examples of work plans, periodic progress reports, published project reports, and implementation records.

Detailed information on how to conduct a peer exchange may be found in the “Participant Workbook of the Peer Exchange for State DOT RD&T Management Processes Training Program of the USDOT, Federal Highway Administration.”

Funding

Costs associated with the peer exchange process will be identified as a line item in the State's Work Program and are eligible for 100 percent Federal funding.

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APPENDIX

Problem Statement – Attachment A

Attachment A

PROBLEM NO.: _____ 200X
(Assigned by Research)

**NEW JERSEY DEPARTMENT OF TRANSPORTATION
REQUEST FOR RESEARCH
“Turning Problems into Solutions”**

TO: Bureau of Research

SUBMITTED BY: _____ DATE: _____

SUBJECT/TITLE: _____

DIVISION/BUREAU: _____

CONTACT PERSON: _____ PHONE NO. _____

PROBLEM STATEMENT/NEED:

ESTIMATED TIME FOR RESULTS (WEEK/MONTHS):

ANTICIPATED BENEFITS:

POTENTIAL YEARLY COST SAVING (if applicable):

REQUESTED BY: _____
MANAGER

PROBLEM NO.: _____ 2005
(Assigned by Research)

**NEW JERSEY DEPARTMENT OF TRANSPORTATION
RESEARCH REQUEST FINAL DISPOSITION REPORT**

TO: Bureau of Research

SUBMITTED BY: _____ DATE: _____

SUBJECT/TITLE: _____

DIVISION/BUREAU: _____ DIRECTOR: _____

ORGANIZATION: ☐ CPM ☐ OPS ☐ P&D ☐ OTHER _____
Other NJDOT, NJ Transit, or MVC

CONTACT PERSON: _____ PHONE NO. _____

Research Reviewer: _____ PHONE NO. _____

ORGANIZATION IMPLEMENTATION CHAMPION _____

RESEARCH PROBLEM STATEMENT SUMMARY:

SUMMARY OF FINDINGS AND SUGGESTED APPROACH:

PROBLEM NO.: _____ 2005

RECOMMENDED RESEARCH PIPELINE:☐**0** No Action☐**1** Full Research Project
(1 year or greater)☐**2** Rapid Research Project
(less than 1 year)☐**3** Literature Search, Survey,
Demonstration Project, Research
Consulting Services**RECOMMENDED RESOURCE CATEGORY:**☐

In-house

☐

University Center

☐

Consultant

☐

National - NCHRP, Pooled Fund

ESTIMATED**DURATION:**

(months)

TASK ORDER COST:**COMMENTS:****RECOMMENDED:**

Research Project Manager

Date:**CONCURENCE:**

Research Bureau Manager

Date:**ORGANIZATIONAL RECOMMENDED PRIORITY**

e.g., CPM-1

CONCURENCE:

Organizational Unit Manager

Date:**FOR Research User Committee (RUC)****RUC RECOMMENDATION:**☐**APPROVED**☐**DISAPPROVED**☐**OTHER**

NJDOT Bureau of Research
Research Process

Request for Proposals (RFP)

EXAMPLE

Date of RFP
March 1, 200X

New Jersey Department of Transportation
Bureau of Research
Scope and Request for Proposals
200X-200X Program

Closing Date
July 1, 200X

**Project _____, Traffic Data Collection, Analysis, and Forecasting for
Mechanistic Pavement Design**

(All Proposals must be prepared in accordance with NJDOT's *Information and Instructions for Preparing Proposals*)

1. **RESEARCH PROBLEM STATEMENT AND BACKGROUND**

[Clearly define the problem and provide any relevant Background]

Traffic information is one of the key data elements required for the design and analysis of pavement structures. The number of equivalent single axle loads (ESALs) has been used in most pavement structural design procedures, including the 1993 AASHTO Guide for Design of Pavement Structures. Equivalency factors are used to determine the number of ESALs. These factors are based on the Present Serviceability Index (PSI) concept and are dependent on the pavement type and structure. Also, studies have shown that these factors are influenced by pavement condition, distress type, failure mode, and other parameters.

Recently, the AASHTO Joint Task Force on Pavements initiated an effort to develop an improved guide for the design of pavement structures by the year 2002. This effort, being undertaken under NJDOT Project 1-37A, *Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures* (2002 Guide), will provide engineers with practical and realistic pavement-design procedures that use existing mechanistic-empirical principles. The mechanistic-based distress prediction models used in the 2002 Guide will require the input of specific data for each axle type and axle load group. Recognizing the constraints on resources available in some state and local highway agencies for traffic data collection, the 2002 Guide will allow for various levels of traffic data collection and analysis. Without clear information on needed traffic data collection and forecasting, effective use of the 2002 Guide cannot be assured.

Research is needed to develop guidelines for traffic data collection and forecasting to ensure state highway agencies' readiness for the implementation of the 2002 Guide.

2. OBJECTIVES

[Provide a narrative and list of the objectives of the study]

The objective of this study is to provide a framework for agencies to collect traffic data for the new pavement design procedure.

The objectives of this research are to

- (1) develop guidelines for collecting and forecasting traffic data to formulate load spectra for use in procedures proposed in the 2002 Guide (see Special Note A) and
- (2) provide guidance on selecting, installing, and operating traffic data collection equipment and handling traffic data.

3. Tasks

[Provide a listing of appropriate general tasks divided into phases based on types of work (e.g., laboratory, field) or by year (e.g., year 1, year 2) or other appropriate milestones]

Accomplishment of the project objectives will require at least the following tasks.

The following general task descriptions are intended to provide a framework for conducting the research. The NJDOT is seeking the insights of proposers on how best to achieve the research objectives. Proposers are expected to describe a research effort that can realistically be accomplished within the constraints of contract time. Proposals must present the proposers' current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach for conducting the required research. The tasks that follow outline a general approach and should not limit the proposer's concepts.

PHASE I – Literature Search

Conduct a comprehensive literature search of the current state of the practice.

PHASE II – Research Approach

[Work may be divided into phases (e.g., Laboratory, Field or Year 1, Year 2) as necessary to clarify tasks]

Task 1. Identify the traffic data elements (e.g., axle configuration, tire pressure, and precision levels) needed for the different levels of traffic data inputs.

Task 2. For each of the data elements identified in Task 1, develop a data collection plan for each level of traffic data inputs proposed. The plan shall also address the use of site-specific, functional

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classification, and system-wide data; estimation of static load spectra; and other load characteristics that will be required to implement the design process contained in the 2002 Guide.

Task 3. Develop guidelines for selection, installation, and operation of traffic data collection equipment for each level of traffic data input. The guidelines shall address equipment specifications, installation considerations, calibration procedures, the means for determining tire configuration on each axle weighed (e.g., single and dual), field measurement of tire contact pressure, and other related factors. The guidelines shall also address data handling (e.g., data processing, quality assurance, and storage).

Task 4. Submit a monthly, quarterly, interim and final report that documents the entire research effort.

4. Implementation and Training Plan

[Include implementation requirements including specification development, demonstrations, and training]

The PI must meet with the following units to develop a staged implementation plan and provide training for the use of the developed traffic collection software.

5. Deliverables: [List of minimum deliverables necessary to complete the project]

| | |
|---------------------------|--|
| <i>Literature Search:</i> | Presentation of Summary of Literature Search Results Discussion to Support and Refine the Project Tasks |
| <i>Task 1</i> | <i>Technical Memorandum of traffic elements</i> |
| <i>Task 2</i> | <i>Detailed data collection plan for elements in Task 1</i> |
| <i>Task 3</i> | Guidelines for selection, installation, and operation of traffic data collection equipment |
| <i>Task 4</i> | <i>Quarterly progress reports, and Final Report</i> |

6. Contract Time: [Check one]

☐ Not to exceed 12 months, which includes 3 months for review and revision of the final report

☐ Not to exceed 24 months, which includes 2 months for review and approval of the interim report and 3 months for review and revision of the final report

7. Research Project Manager: **Research Project Customer:**

8. Authorization to Begin Work: January 200X--estimated

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9. Deadline

Proposals (10 single-bound copies) are due not later than 4:00 p.m. on July 1, 200X.

This is a firm deadline, and extensions simply are not granted.

10. Delivery Instructions :

For private, paid messenger services such as Federal Express, DHL, UPS, etc., or for hand-carried deliveries:

Research Program 200X-200X PROPOSAL-NJDOT
New Jersey Department of Transportation
Bureau of Research
1035 Parkway Avenue
Trenton, New Jersey 08625-0600

For U.S. Postal Service mail:

New Jersey Department of Transportation
ATTN: Manager, Bureau of Research
PO Box 600
Trenton, New Jersey 08625-0600

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Responsibilities of the Research Project Selection and Implementation Panel:

The Research Project Selection and Implementation Panel are responsible for:

- Development of the Request for Proposals (RFP)*
- Review of proposals
- Selection of the best proposal
- Negotiation of final proposal and budget
- Review of the project progress and set future direction at quarterly meeting
- Develop NJDOT Specifications
- Facilitate implementation of research project findings
- Facilitate training of NJDOT staff
- Review of technical memorandum, quarterly reports, and final report

* Panel members may be added or replaced as necessary based on the phase of the work and project needs

The Research Project Manager will coordinate these activities. He is responsible for:

- Organizing the panel with the customer based on project needs
- Distributing proposals and evaluation forms
- Organizing project meetings to discuss proposals and developing the project proposal selection evaluation debriefing for university PI
- Organizing project meetings with PI to discuss proposals and developing the final proposal and budget
- Notifying panel of quarterly project meetings and leading discussions of project progress and future direction.
- Facilitating specification development and training (as needed)
- Facilitating implementation of research project findings
- Distributing technical memorandum, quarterly reports, and final report to panel and organizing review
- Ensuring that the project objectives are met and deliverables are produced
- Holding a final project meeting to close the project and assess customer satisfaction with project deliverables and time

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Proposal Evaluation Form

**New Jersey Department of Transportation
Bureau of Research Program**

The Evaluation of Proposals should be completed using the **Proposal Evaluation Form** (on the reverse side). Additional comment pages may be attached as needed.

Evaluation Considerations

1. **Demonstrated Understanding of the Scope or Work:** The proposal should present a clear and concise understanding of the problem and the scope of the work outlined in the Request for proposals.
2. **Research Approach and Technical Objectives:** The evaluation of the research approach should consider consistency with the objectives and the scientific and practical aspects of the research methodology. This should include such items as the approach to data collection, data analysis, and applicability of equipment proposed for use.
3. **THE EXPERIENCE, QUALIFICATIONS AND AVAILABILITY OF RESEARCH TEAM:** The reviewer should consider the relevant education, experience, and background of the key project individuals and graduate students. Has there been work on related projects? What is the recent applicable experience of the Organization? Proposals are desired from individuals having demonstrated capability and expertise in the subject problem area. The reviewer's evaluation should be based on the evidence contained in the proposal pertaining to both their experience and the indicated amount of effort by the principal investigator(s) and the team.
4. **PLAN FOR ENSURING APPLICATIONS OF RESULTS:** What is the implementation plan? Is it adequate for the time and resources allowed? A realistic plan detailing the steps to successful implementation of the research is desired. Particular consideration should be given to whether or not there might be any financial or institutional barriers to implementation of products from the research and outline the steps necessary for overcoming these problems.
5. **THE ADEQUACY AND AVAILABILITY OF FACILITIES FOR THIS PROJECT:** This includes office facilities, laboratory facilities, project office location, equipment and staffing. The reviewer's evaluation should be based on the evidence contained in the proposal. It is important to consider whether facilities and equipment are actually available or are the proposed to be purchased or built.
6. **INNOVATIONS IN THE PROPOSALS:** Are there any unique, new and innovative ideas, techniques, materials, or procedures, contained in this proposal? Research projects should "stretch the envelope" to include the development or application of innovative ideas, techniques, materials, or procedures that enhance the transportation system in New Jersey.

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Bureau of Research
PROPOSAL EVALUATION FORM 200X-200X PROGRAM

PROJECT 200X - _____

| | | | | | |
|--|--|---------------|--|----------------|--|
| EVALUATOR: | | PHONE: | | FAX: | |
| Research Selection and Implementation Panel Member | | | | | |
| UNIVERSITY: | | | | Center: | |

DETERMINE THE SCORES: Please review each of the proposals and score each one before **July 13**. Assign a whole number in the rating blank (**100** is maximum), to each of the criteria below. Meetings will be scheduled between **July 16 and July 27** to discuss the selected proposal and to firm up any comments concerning its selection.

1. DEMONSTRATED UNDERSTANDING OF THE SCOPE OF WORK

| | | | | | |
|--------|---|--------|--------------------------|---|--------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.15 | | | | | |

2. RESEARCH APPROACH AND TECHNICAL OBJECTIVES

| | | | | | |
|--------|---|--------|--------------------------|---|--------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.30 | | | | | |

3. THE EXPERIENCE, QUALIFICATIONS AND AVAILABILITY OF RESEARCH TEAM

| | | | | | |
|--------|---|--------|--------------------------|---|--------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.20 | | | | | |

4. PLAN FOR ENSURING APPLICATIONS OF RESULTS

| | | | | | |
|--------|---|--------|--------------------------|---|--------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.15 | | | | | |

5. THE ADEQUACY AND AVAILABILITY OF FACILITIES FOR THIS PROJECT

| | | | | | |
|--------|---|--------|--------------------------|---|--------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.10 | | | | | |

5. INNOVATIONS IN THE PROPOSALS

| | | | | | |
|--------|---|--------|--------------------------|---|--------------------|
| WEIGHT | X | RATING | (100 is maximum) | = | <u>SCORE</u> |
| 0.10 | | | | | |
| | | | | | <u>TOTAL SCORE</u> |

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NJDOT Research Quarterly Report

QUARTERLY PROGRESS REPORT

| | | | |
|---------------------------------|--|---------------------------------|--|
| Project Title: | | | |
| RFP NUMBER: | | NJDOT RESEARCH PROJECT MANAGER: | |
| TASK ORDER NUMBER/Study Number: | | PRINCIPAL INVESTIGATOR: | |
| Study Start Date: | | Period Covered: | |
| Study End Date: | | | |

| Task | % of Total | % of Task this quarter | % of Task to date | % of Total Complete |
|-------------------|------------|---------------------------|----------------------|------------------------|
| Literature Search | | | | |
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| Final Report | | | | |
| | | | | |
| TOTAL | 100% | | | [Column Sum] |

1. Progress this quarter by task:
2. Proposed activities for next quarter by task
3. List of deliverables provided in this quarter by task (product date)
4. Progress on Implementation and Training Activities
5. Problems/Proposed Solutions
6. Budget Summary

| | |
|---|---|
| Total Project Budget(# of years) | |
| Total Project Expenditure to date | |
| % of Total Project Budget Expended | % |
| | |
| Task Order Number/Study Number: | |
| Current Task Order Budget (# of years) | |
| Actual Expenditure to date against current task order | |
| % of current task order budget expended | % |

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FHWA Quarterly Report

STATE PLANNING AND RESEARCH PROGRAM, 200X – 200X

ACTIVITY: Administration of Transportation Research Board (TRB) Correlation Service - 4500099/7010
MANAGER: Nicholas Vitillo
UNIT: Bureau of Research

PURPOSE:

Serve as the focal point for activities with the Transportation Research Board.

DESCRIPTION:

The cost of the TRB Correlation Service is provided under this project. Membership includes the collection of information from various sources on past, current and proposed research related to transportation, admission to TRB Annual Meeting and conference programs, the dissemination of useful findings of research, various TRB publications, and the output of the Transportation Information Service (TRIS searches). This is a valuable source of information and professional contacts.

OBJECTIVES:

- TRIS searches were conducted through the Department's Information Center and DIALOG. Various reports received and distributed.
- Processed paperwork for continuation of service for this fiscal year.
- Various DOT employees attended annual TRB meeting.

TASKS/ACTIONS:

- This is a continuing activity involving technology transfer, information searches and information distribution. It also provides the mechanism for NJDOT staff participation with TRB.

QUARTER TWO / YEAR TWO ACCOMPLISHMENTS:

- Presented plans for 2001 attendance at the TRB annual conference to senior management.
- Widely disseminated reports and publications received from TRB through the Research Library.
- Prepared Summation of TRB Visit
- Continue planning systems requirements for sending info electronically from NJDOT to RIPS and TRIS using in-house research project tracking systems (PROMPTS).
- Coordinate completion of surveys and questionnaires received from TRB/NCHRP.

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Description of the Research User's Committee

The Research User's Committee (RUG) reviews research projects and makes recommendations on the direction of the work effort for projects to assure that the results will meet the needs of the Department and the project objectives, the feasibility of continuing, modifying, or terminating a project, and methods of implementing results during the course of the project as well as after its completion. The RUG membership is comprised of key middle level managers from NJDOT and other appropriate organizations who assist in the development of the Research and Technology Work Program.

The goals of the Research User's Committee are:

1. To steer the Research Program to deliver a variety of new materials methods, practices, and ideas to fulfill the Department's mission through the selection of value added, cost effective, customer driven, and results oriented research activities which maximize the use of available resources.
2. To consider research proposals from all areas of the Department which, through problem solving, innovation, and creativity, using prototypes, demonstrations or tests, can act as catalysts for change to improve the Department's programs, methods, practices or products.
3. To recommend research projects which, within defined schedules, will yield useful, customer supported, quick benefit results and products which can readily be integrated into the Department's programs and projects to improve overall quality and efficiency.
4. To prioritize among competing needs to recommend a program which maximizes the expected benefits from available resources.

List of titles on the RUC

22 - RUC Members

| |
|--|
| Chairman |
| (Secretary |
| Manager, Research & Technology |
| Manager, QMS |
| Manager, Construction & Maintenance |
| Manager, Transportation Systems Planning |
| Manager, Project Manager |
| Manager, Design Services |
| Manager, Operations Support |
| Manager, Transportation Operations |
| Manager - DMV Representative |

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| |
|--|
| Executive Manager, Operations North |
| Executive Manager, Operations Central |
| Executive Manager, Operations South |
| Manager, Aeronautics & Freight Services |
| Manager, Local Govt. Services & Economic Development |
| Manager, MIS |
| Manager, Transportation Data Development |
| Manager, Capital Program Development |
| Senior Manager, Planning, Research & Development; NJ Transit |
| Manager, Maritime Services |
| FHWA |
| Manager, Research Bureau |

3/16/01

RESOURCES AVAILABLE FOR NJDOT RESEARCH

NJDOT Staff

The Bureau of Research is responsible for the NJDOT Research Program that oversees the research, technology transfer, and technology deployment work of specialized NJDOT research professionals assigned to the Program. These professionals and Quality Management Services staff are responsible for conducting the work of, supporting the work of, and/or managing contracts within the Program. In-house resources are primarily limited by the availability of qualified research staff in the Research and Technology Program. In-house salaries have been primarily used to address research implementation, technology transfer and research contract management activities.

Research Consultants

The Bureau of Research may contracts with outside consultants to perform the work of the Research and Technology Program. The limitation to the use of this resource is the availability of State, Planning, and Research (SPR), state, and other funds and the longer time it takes to execute a contract with a commercial or nonprofit organization. (The selection of the research consultant is covered by the procedures of the Consultant Selection Committee).

Region II University Transportation Research Center (UTRC) at CUNY

Twelve Universities in New York, New Jersey, Puerto Rico and the Virgin Islands (federal Region II) have formed a consortium, funded by the USDOT and local agencies. Academia from these schools, particularly the New Jersey schools of Princeton, Rutgers, and Stevens Institute of Technology, are solicited through The City University of New York (CUNY) to address research needs of regional concerns for NJDOT. The center annually receives funds from USDOT to match with state NJDOT and other agency funds to conduct research projects. NJDOT provides annual state funds to the Research Foundation of CUNY by means of a Research and Planning Basic Agreement to match with

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at least the same amount of their own federal funds in order to perform specific research of interest to NJDOT.

National Center for Transportation and Industrial Productivity (NCTIP) at NJIT

The mission of the NCTIP is to “Contribute to the increase in transportation and industrial productivity of the nation’s transportation systems, facilities, and public and private organizations by conducting high quality, innovative research, education, and technology transfer activities in the areas of passenger and freight movement efficiency, and regulatory and institutional efficiency.” These include finding ways of increasing productivity through transportation improvements, ranging from improving private and public carrier fleet productivity through better scheduling of activities and equipment management to improving personal productivity by reducing congestion and improving safety on our nation's highway and transit systems.

The center annually receives funds from USDOT to match with state NJDOT and other private/public agency funds to conduct research projects. NJDOT provides annual state funds to NJIT for NCTIP by means of a Research and Planning Basic Agreement to match with at least the same amount of their own federal funds in order to perform specific research of interest to NJDOT.

Center for Advanced Infrastructure and Transportation (CAIT) at Rutgers University

The center annually receives funds from USDOT to match with state NJDOT and other agency funds to conduct research projects. NJDOT provides annual funds to Rutgers University for CAIT by means of a Research and Planning Basic Agreement as research grants or to match with at least the same amount of their own federal funds in order to perform specific research of interest to NJDOT.

Other University Research Partners and Sub-recipients

In addition to the Federally funded schools, NJDOT currently solicits proposals from other NJ Universities by way of direct task orders with no matching fund requirements. Rowan University and Stevens Institute of Technology perform research as partners to the NJDOT.

FHWA Pooled Fund

The FHWA acts as the coordinator/manager in soliciting financial support from states for selected problems. If sufficient interest exists among states, a consultant is retained to conduct the study, and each of the contributing states is represented on the project committee. SPR funds are used as a state match, but in the future, other funds should be sought by NJDOT.

National Cooperative Highway Research Program (NCHRP)

NCHRP includes research, synthesis, IDEA, and other related projects. The NCHRP is programmed with input and funding from the American Association of State and Highway Transportation Officials (AASHTO) and is managed by the Transportation Research Board (TRB) of the National Research

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Council of the National Academy of Sciences. Annual funding to NCHRP is provided by the state DOT's, the FHWA and other agencies for highway research. The state DOT's provide significant formula funding. Member agencies annually submit research problem statements to the AASHTO Research Advisory Committee (RAC) which makes recommendations to the AASHTO Standing Committee on Research (SCOR). The research projects typically range between \$30,000 and \$500,000 and up to four years. Synthesis of the state of the art of practice projects range from \$20,000 to \$50,000 and are typically several years in duration.

Transportation Research Board

The TRB provides NJDOT with the Research-In-Progress (RIP), Transportation Research Information Service (TRIS), opportunities to participate in national technical committee activities, free admission to Annual TRB meetings, and opportunities to participate on NCHRP projects, Transit Cooperative Research Program (TCRP) projects, and other technical panels to employees of member organizations. NJDOT provides significant annual formula funds to TRB. The TRIS is an essential service to support the scoping of NJDOT research projects with the assistance of the NJDOT Research Library. Participation in TRB national committee activities is important to retain a comprehensive knowledge of and influence in the evolving research needs for the improvement of transportation. Each year, at its January Annual Meetings in Washington, DC, TRB holds 500 to 700 technical session and committee meetings on transportation research, and it programs about 50 related national transportation organization meetings to which approximately 8,000 transportation professionals from DOTs and other agencies participate to share new technical transportation knowledge and determine new research needs.

Other Research and Technology Resources

In order to discover and create new knowledge or new technology for the improvement of transportation, the Bureau of Research is not limited to certain or predominant resources. Funding for technical advice has come from design and construction projects. Funding for large scale demonstrations and evaluations have been initiated and paid for through federal grants. Special resources needed for projects have been used from other state departments, local governments, local or regional utilities, universities in New Jersey, other states, and federal testing facilities using temporary arrangements and agreements.